AbstractID: 4456 Title: Heterogeneity Corrections in the IMRT era

Intensity modulated radiation therapy (IMRT) has revolutionized the treatment planning process. We are now able to produce treatment plans for complex target shapes that have remarkable dose conformity while respecting the tolerance doses to critical structures. Although the emphasis has been given in the implementation of faster, more efficient, and more comprehensive optimization algorithms to solve the inverse problem, little has been done in the dose calculation aspect of the planning process. The convolution/superposition algorithm is the most popular photon dose engine used in treatment planning, while the Monte Carlo algorithm although available, remains a futuristic option.

In this presentation we will discuss the algorithms that have historically been used for treatment planning with photon beams with emphasis on the convolution and Monte Carlo based methodologies and their application in IMRT planning. Clinical examples will also be presented to demonstrate the use and outcome of dose calculations in homogeneous and heterogeneous media.

Educational Objectives:
1. Review of dose calculation algorithms for photon beams
2. Demonstrate the effect of dose algorithm selection in IMRT planning